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ABSTRACT

This study provides information about steroids and recommends programs to educators and coaches who are involved with educating students about steroid abuse. The first part of the study contains annotations that examine the rationale and motivation of those who have used anabolic steroids. The next part of the study contains annotations that examine some of the physical and psychological effects anabolic steroids have on body composition and performance. The annotations in the last and major part of the study look at some solutions to preventing and controlling anabolic steroid use among high school students, and to educating students about the dangers of such use. The annotations in each section are arranged by year--earliest to most recent. (JD)

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AN EDUCATOR'S GUIDE TO THE LITERATURE DEALING WITH THE RATIONALE FOR STEROID USE, EFFECTS THEY HAVE ON BODY COMPOSITION AND PERFORMANCE, WITH SOLUTIONS TO PREVENTING STEROID ABUSE IN YOUTH

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INTRODUCTION

Their clinical names may not be household terms (methandrostenolone, oxymetholone, and stanozolol to name a few), but even the couch potato sports fan is at least aware of the existence of anabolic steroids. Commonly applied slang terms including "juice" and "bean" are heard everyday in corner gyms, university strength training complexes, and various other "iron emporiums" across the country. Whatever you choose to call them, the undeniable fact remains that these drugs represent one of the most critical substance abuse issues in our society today (Mannie : 10).

Anabolic steroids were reportedly first used during World War II when they were given to German troops to enhance their aggressiveness. Their first use in athletics was supposedly by the Russians in 1954. A team physician from the United States recognized their use at that time and, in the late 1950's, conducted tests of the drugs in American athletes. Anabolic steroids have become increasingly popular among athletes since that time. At first they were used almost exclusively by weight lifters and heavy throwers; their use later spread to football players, swimmers, and other track and field participants (Wade : 1400).

Today, the use of anabolic steroids by athletes and non-athletes has reached almost epidemic proportions. The statistics warrant our concern: 1.) 250,000 to 500,000 teens nation wide may be using steroids; 2.) 8% of 12th grade boys

surveyed in 39 schools nation wide had used steroids at least once; and 3.) Federal Food and Drug Administration estimates that annual illegal sales of steroids may total $100 million dollars a year (Flax : 1t). Athletes and non-athletes of all ages need to be properly educated about the danger and effects of anabolic steroid use.

> What is needed is education, starting at the elementary school level, discussing drugs and their actions and adverse effects. You can't wait until college and the pro levels. This should begin for the student athlete and get away from the old hygiene classes where you are told alcohol, tobacco, and drugs are bad for you. There is great value in bringing in former pro athletes, who student athletes will identify with, when they say, "I paid the price." This education must be continued up through the ranks. You need a fine line that is obeyed (Goldman : 153).
>
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STATEMENT OF THE PROBLEM AND PURPOSE OF THE STUDY

Most educators, coaches and students were either unaware or naive about the newest drug crisis to plague American High Schools. Just as with all types of drug abuse, providing our young people with factual information on the dangers of steroids is paramount if educators and coaches are to prevent steroid use among high school students.

The purpose of this research study was to provide factual information about steroids and recommend programs to educators and coaches who are involved with educating students about steroid abuse.

ORGANIZATION OF THE STUDY

The first part of the study contains annotations that examine the rationale and motivation of those who have used anabolic steroids. The next part of the study examines some of the physical and psychological effects anabolic steroids have on body composition and performance. The last and major part of the study looks at some solutions to educating, preventing, and controlling anabolic steroid use among high school students. The annotations in each section have been arranged by year - earliest to most recent.

LIMITATIONS OF THE STUDY

The research on this subject was limited in several ways. First, most of the healthy athletes used in the scientific studies were prescribed lower doses than what athletes today are believed to be actually using (Lamb, p. 36). Second, the conditions could not be controlled so the validity of the research was threatened and quite controversial. Third, most studies were short term so the medical and scientific communities doubt the positive effect of steroids, citing the inconsistencies of studies, with a large number demonstrating no improvement. Lastly, there was limited research found on what programs have worked to prevent steroid abuse at the high school level.

GLOSSARY

1. AAU - Amateur Athletic union.
2. anabolic - "Building-up effects refer to the changes induced in muscle, bone and blood," (Mannie : 10).
3. anthropometry - "The science of measuring the human body and its parts and functional capacities," (Webster's : 93).
4. atherosclerosis - "Hardening of the arteries. It is the process whereby fats carried in the blood stream gradually pile up on the walls of arteries," (Medical and Health Encyclopedia : 357).
5. atrophy - "Muscle and bone tissue becomes fragile, shrinks and weakens if they are not used for too long a time," (Medical and Health Encyclopedia : 10).
6. dianabol - "Synthetic anabolic steroid manufactured by Ciba, Dianabol is its brand name," (Goldman : 87).
7. diastolic - "Force of blood between beats, when the ventricles of the heart relax," (Health : 220).
8. double-blind - "Situation where neither the experimental subject nor the experiment's evaluator knows who is taking the real drug or who is taking the placebo," (Goldman : 37).
9. FDA - Food and Drug Administration.
10. gonatropins - "Any hormone having a stimulating effect on the testicles," (Encyclopedia and Dictionary of Medicine, Nursing and Allied Health : 521).
11. gynecomastia - "Breast development in men," (Goldman : 64).

12. libido - "Sexual impulse or instinctual drive associated with sexual desire, pleasure, or creativity," (Medical and Health Encyclopedia : 406).
13. methandrostenolone - "Synthetic anabolic steroid manufactured by Ciba. Methandrostenolone is the generic or universal name given to Dianabol," (Goldman : 87).
14. NCAA - National Collegiate Athlete Association.
15. NFL - National Football League.
16. oxymetholone - "A drug that increases male characteristics. It is prescribed in the treatment of testosterone deficiency osteoporosis, and female breast cancer and for the stimulation of growth, weight gain, and red blood cell production," (Mosby's : 789).
17. placebo - "Preparation given for its psychological effect to satisfy the patient or to act as a control in an experimental series. Comes from the Latin verb "to please." Fake medicine usually a tablet or a capsule containing nothing but sugar or an injection of salt solution," (Goldman : 37).
18. proliferation - "Rapid and repeated production of new parts," (Webster's : 1814).
19. SADD - "Students Against Drunk Driving or Student Athletes Detest Drugs," (Brady : 1C).
20. stanozolol - "Synthetic anabolic steroid manufactured by Winthrop. Stanozolol is the generic or universal name given to the steroid," (Goldman : 87).

21. steroids - "Any one of several compounds derived from testosterone or prepared synthetically to promote general body growth," (Mosby's : 51).

22. systolic - "Force of blood pushing against the walls of the arteries when the ventricles of the heart contract," (Health : 220).

23. testosterone - "A naturally occurring androgenic hormone," (Mosby's : 1062).

24. therapeutically - "A combining form pertaining to medical treatment by specified techniques," (Mosby's : 1066).

25. virilization - "A process in which secondary male sexual characteristics are acquired by a female, usually as the result of adrenal dysfunction or hormonal medication," (Mosby's : 1138).

ANNOTATIONS

RATIONALE AND MOTIVATION FOR STEROID USE

Riley, Dan B. "Danger! Athletes who are Dying to Win." Scholastic Coach 54 : (November 1984), 48-50, 66-67.

This article reviewed some of the rationale and motivational reasons athletes take steroids. Riley, who was the conditioning coach for the Washington Redskins cited two big reasons for steroid use among athletes. First, society has accepted drugs. Every other TV commercial tells people to take a pill for everything from a runny nose to an upset stomach. So when a coach or friend tells the athlete to take a pill that will make him big and strong, he doesn't hesitate. Second, the pressure put on athletes to win. Arnold Schwarzenegger is used as an example about the pressure to win. Years ago Schwarzenegger was asked if he used steroids. He said yes. He was then asked if he thought they helped. He said no. Finally he was asked why he used them. He replied, "Because everyone else does and if there is any benefit I don't want my rivals to have an edge" (66). When steroids first became popular, athletes used .05 mg. a day. Today Riley believes athletes are using 100-200 mg. daily. This makes the use of steroids so dangerous it's impossible to get permission to do studies on human beings. Riley concludes by emphasizing the need to educate kids about the dangers of steroids and removing the unseemly pressure on kids to win at all cost.

Fuller, John R., and Marc J. Lafountain. "Performance Enhancing Drugs in Sport: A Different Form of Drug Abuse." Adolescence 22:88 (Winter 1987) 969-976.

The use and abuse of drugs in American society was recognized as a major issue among those who study youth. This article reviewed addresses an often overlooked area of drug abuse: performance-enhancing drugs in sports. This article examines the seriousness and prevalence of performance-enhancing drugs and presents the results of a series of interviews with steroid users to determine their attitudes and rationale for steroid use. The real question is why anyone who has heard about the harmful effects of these drugs would expose himself to heart attacks and the psychological and emotional instabilities. The authors conclude that perhaps the current win-at-all-costs mentality costs too much. Fuller and Lafountain also stated, "In order to alter the actions of youths, administrators, coaches, and families must reflect on society's values and institutions as they relate to the current philosophy of games and winning that is generating this form of drug abuse" (975).

King, Larry, and Don Bank. "Seeking Incredible Bulk, Teens Play With Fire by Using Steroid Drugs in Quest to Beef Up." St. Petersburg Times. 7 (June, 1987) pp. 1Bt.

The authors of this article interviewed coaches, police officers, and teen-age boys to determine if steroids were surfacing at the high school level. The extent of the problem was unclear, but those familiar with it said steroids are becoming more and more noticeable among high school students. "It's a very bad problem," stated Don Gates, a narcotics detective for the Tampa Police Department. "We're seeing more and more of it. We're getting calls from parents who are concerned" (1B). Teenage boys interviewed believed steroids are used by more non-athletes than athletes. They stated skinny kids who were tired of being pushed around or ignored, long for the muscles that could bring them distinction. Instead of spending years of hard work in the gyms, students were beginning to try steroids as a quicker route to hulking bodies. In spite of such accounts, some area school officials stated they were unaware of any steroid use and believed they did not have a wide spread problem.

Schiller, Bill. "Steroids in the High Schools." Toronto Star 23 (July, 1988) pp. Alt.

The main purpose of this article was to inform readers that steroids are prevalent in the majority if not all the high schools in Toronto. Lynda Filsinger, of Vancouver, stated that a drugs and sports hotline there had received more than 1,000 calls a year since opening in 1985. "Almost all of the callers talked about steroids and most callers were either taking them or thinking about taking them" (A1). Schiller interviewed Toronto shot-putter Peter Daija, who was to be reinstated for international competition after a two year suspension for alleged steroid use. Daija stated steroids are available in many gyms in Toronto and widely used by non-competitive athletes and body builders. He said, "It's incredible, you've got high school boys in the gym taking steroids to have big arms to impress women" (A1).

PHYSICAL AND PSYCHOLOGICAL EFFECTS OF ANABOLIC STEROIDS ON BODY COMPOSITION AND PERFORMANCE

Casner, S.W. Jr., Ronald G. Early, and Robert B. Carlson. "Anabolic steroid effects on body composition in normal young men." Journal of Sports Medicine and Physical Fitness, 11 : 1971, 98-103.

The authors of this study investigated the effects of stanozolol (anabolic steroid) on the body weight, body composition, and strength of normal young men. Twenty-seven normal young men were divided into four groups. Each group represented one of the four possible combinations of two independent variables, steroid therapy and activity level. Thirteen subjects received two mg. of stanozolol three times per day for forty-two days of a fifty-six day experimental period. Fourteen subjects took placeboes according to the same schedule. Measures of total body water, body weight, specific gravity and muscular strength were made on days one, twenty-eight, and fifty-six. The data indicated that both groups taking anabolic steroids gained significantly more weight than the two groups taking placeboes, with some subjects in the anabolic steroid group gaining as much as eleven pounds. No significant differences among the four groups were noted on body composition and muscular strength.

Wade, Nicholas. "Anabolic Steroids: Doctors Denounce Them, but Athletes Aren't Listening," Science 176 : (June 1972), 1399-1403.

The author of this article interviewed people in the sports and medical establishments to find out what anabolic steroids do to the human frame. Wade concludes that the few scientific studies that have been done are a mixed bag, some suggesting that steroids are no good for athletes, others that they are effective. The athletes who take them believe that anabolic steroids help to increase weight and muscular strength. The American Medical Association condemns the use of steroids by athletes. Use of steroids is a complete waste of time and money," said Allan Ryan, team physician at the University of Wisconsin and a past president of the American College of Sports Medicine (1399). Wade stated medical researchers have shown little interest in the messy task of sorting out the psychological effects of anabolic steroids on athletes from the physiological effect. As for sports organizations such as the NCAA and the AAU, the use of any drug is contrary to their ethics, and official attitudes range from reluctance to discuss the issue to an outright denial that the drugs are effective.

Ariel, Gideon, and William Saville. "Anabolic Steroids: the physiological effects of placebos." Medicine and Science in Sports 4 : (1972), 124-126.

Ariel stated that motivational factors could influence physical performance measures. A positive attitude towards the beneficial effects of an anabolic steroid by highly motivated, athletes seems reasonable. In this study fifteen male varsity athletes were informed that some of them would be selected to receive an anabolic steroid. All 15 volunteers had experienced two years of hard weight training, 5 days a week. For a period of four months prior to the actual experimental period all subjects trained for five days and were tested on the following day in the seated, military, and bench presses, and in the curl and squat. The subjects were informed during this preliminary period that the most improved lifters would be selected and given an anabolic steroid. Six athletes were chosen and given placebo pills daily with the information they contained 10 mg. of Dianabol. The results of this study clearly indicate that although the subjects continued to improve during the pre-placebo period, the improvement during the placebo period was significantly greater. The authors believe that taking the placebo apparently supplied the necessary psychological benefits to utilize strength gains above and beyond that which would be expected from a reasonable progression.

Win-May, M., and M. Mya-Tu. "The Effects of Anabolic Steroids on Physical Fitness." Journal of Sports Medicine and Physical Fitness 15 : (1975), 266-271.

The authors of this research conducted a study to assess the effects of anabolic steroids on the various areas included under physical fitness. 31 male students, ages 18-23 years volunteered as subjects. The subjects were randomly divided into two groups. A double-blind technique was used and one group received the placebo while the other group received the anabolic steroid 5 mg. daily of Dianabol was given for three months. The physical fitness assessments were done at approximately two-week intervals, beginning one month before the drug administration, during the three months of administration, and continuing one month after the drug was stopped. Compared to the placebo group, the authors found a significant increase in the anthropometric measurements and in muscular strength of the athletes using steroids. In the balance, coordination, flexibility, and the cardio-respiratory endurance areas there was no significant difference between the two groups.

Loughton, S.J., and R.O. Ruhling. "Human Strength and Endurance Responses to Anabolic Steroid and Training." Journal of Sports Medicine and Physical Fitness 17 : (1977), 285-296.

The authors of this study wanted to determine the changes that would occur in selected physical, physiological, and anthropometric measurements taken on trained and untrained subjects before, during, and after the administration of an anabolic steroid in conjunction with a physical training program and a protein-rich, calorie regulated diet. Twelve male caucasian subjects between the ages of 18 and 27 years participated in the experiment. Six of the 12 subjects were non-athletes and the remaining six subjects were athletes. The 12 subjects were divided into four groups. (Trained Dianabol, Untrained Dianabol, Trained Placebo, Untrained Placebo). The subjects were then trained for 6 days a week on a program designed to improve cardiovascular endurance and muscular strength. Drug treatment coincided with the training program and was administered in a double-blind procedure. The four groups received one 10 mg. tablet daily for the first 3 weeks and one 5 mg. tablet daily for the last 3 weeks. Daily caloric intake was also regulated and supplemented with protein. Physiological data was collected during the first, third, and sixth weeks. The only results that were significant in this study showed TD and UTD had greater body weight gains than either TP or UTP did between all three test sessions. The changes observed in all other areas tested indicated that they were due to the physical training regiment employed rather than to the use of Dianabol.

Olweus, Dan, et al. "Testosterone, Aggression, Physical, and Personality Dimensions in Normal Adolescent Males." Psychosomatic Medicine 42:2 (March 1980), 253-267.

The authors of this research study attempted to provide a rationale for the hypothesis that high testosterone leads to strong and masculine appearance. Fifty-eight normal adolescent Swedish boys aged 16, provided two sets of blood samples for plasma, testosterone, analysis as well as data on a number of personality inventories and rating scales assessing aggression, impulsiveness, lack of frustration, tolerance and anxiety. The authors of this study found there was a significant association between plasma testosterone levels and self-reports of physical and verbal aggression, mainly reflecting responsiveness to provocation and threat. Lack of frustration tolerance was also related to testosterone levels. In this study, there was only a weak nonsignificant correlation between testosterone levels and the self-report scale of antisocial behavior, covering such behaviors as petty theft, truancy, and destruction of other's property. The authors argued that the present failure to find a clear association between testosterone and antisocial behavior was due to the fact that self-reports rather than some kind of records of actual antisocial behavior were used.

Strauss, Richard H., et al. "Side Effects of Anabolic Steroids in Weight-Trained Men." The Physician and Sports Medicine 11:12 (December 1983) 87-96.

The authors of this study tried to answer two important questions: 1.) Do anabolic steroids work? 2.) Do they have detrimental side effects? The authors studied 27 body builders and 5 power lifters on a one-time basis. These subjects and 7 control athletes who had never used steroids were interviewed and under went a medical examination. Gynecomastia was detected in 4 of the 20 current users and in 1 of the 19 other subjects. 67% of the users reported temporary changes in libido, and 56% reported a temporary increase in irritability or aggressive behavior. Some athletes noted an increased tendency to engage in physical fighting. The study also showed no differences in systolic or diastolic blood pressure among the three groups. The authors agreed the long-term effects of anabolic steroid use by healthy people are unknown.

Lamb, David R. Ph.D. "Anabolic Steroids in Athletics: How well do they work and how dangerous are they?" The American Journal of Sports Medicine 12:1 (January/February 1984) 31-88.

Lamb stated, "It is clear that athletes will engage in extreme behaviors if they believe they can achieve a 'winning edge'" (31). This article summarizes Lamb's studies and research on anabolic steroid use. The current regiments used for steroid doping include combinations of injectable and oral preparations of steroids at doses 10 to 40 times greater than those prescribed therapeutically. Analysis of these studies in Lamb's article suggests that most persons will gain an average of 2.2 kg. of lean body weight during steroid administration, but that there exist great individual differences in strength changes induced by steroids. Approximately 50% of the investigations show significant improvements in strength measurements with steroid treatment, whereas the remainder show indefinite effects. There is no substantial evidence to support the use of anabolic steroids for improving aerobic work capacity. Lamb's research also showed anabolic steroids cause severe virilization in women, and testicular atrophy and reduced blood levels of gonatropins and testosterone in adult males.

Alen, Markkv, MD. "Androgenic-Anabolic Steroid Effects on Serum Thyroid, Pituitary and Steroid Hormones in Athletes." The American Journal of Sports Medicine 15:4 (July/August 1987) 357-361.

The purpose of this article was to study the effects of self-administered testosterone and anabolic steroids in high doses on thyroid function in association with strength training. Endocrine responses in seven power athletes were investigated during a 12 week strength training period, when the athletes were taking high doses of anabolic steroids, and during the 13 weeks following drug withdrawal. The results of this study show that anabolic steroid use leads to gain in body weight. The inhibition of testicular endocrine function also became obvious following the cessation of drug use. In general, the studies findings suggest that the availability of thyroid hormones was not disturbed in the athletes and therefore does not have any demonstrable effect on the athletes' performance in strength training.

SOLUTIONS TO EDUCATING, PREVENTING, AND CONTROLLING ANABOLIC STEROID USE

White, George L., et al. "Preventing Steroid Abuse in Youth: The Health Educator's Role." Health Education 18 (August/September 1987) 32-35.

"The continued belief in the myth that anabolic steroids will somehow transform the average athlete into a super athlete is evidenced by the estimated one million U. S. athletes taking these drugs. The need to educate the young people concerning steroid use is obvious" (32), said one of the author's of the article reviewed. Factual information regarding steroids and their use should be incorporated into existing health education courses. It is the opinion of the authors that health educators should include a discussion of anabolic steroid use as a topic in the drug education curriculum. Students should understand what steroids are, what their effects are, how they are popularized, and the legal implications. Drug education without a discussion of anabolic steroids would be incomplete. Health educators must help eradicate the steroid myth. Athletic ability and good health are much more dependent upon genetics, training, and the application of proven health principles than the use of anabolic steroids.

U. S. Department of Education, Schools Without Drugs: The Challenge, What Works: Prevention Program for Athletes. 2:2 (November 1987), 10-11.

This article reviewed a successful prevention education program for students in the Forest Hills School District. They decided to survey seniors and eighth graders in an effort to find out just how serious their problem was. The results of the survey startled school personnel so much that they committed themselves to helping their students stop using drugs and alcohol. Principal Michael D. Hall of Anderson High School in Forest Hills School District, credits the success of the program to perseverance. Hall made it clear to the students at Anderson High School that school officials were never going to go away. The Forest Hills program consisted of nine steps in their approach to prevention education for students. These included: 1.) Find out if students have a drug and alcohol problem, 2.) Meet with school coaches and enlist their support, 3.) Meet with captains of every sports team in the school and seek their help, 4.) Involve parents in the program, 5.) Involve the community in the program, 6.) Keep parents involved, 7.) Be sure that students have the facts about drugs, steroids, and alcohol and about the program, 8.) At the end of the year, resurvey students, and 9.) Conduct a year-end evaluation with teachers, coaches, captains, athletes, and parents. Survey results showed that substance use among students at Anderson High School had declined 62 per cent during the four years the program had been in place. It should be noted minimal gains were reported in the first year of the program. Hall stated if he had one piece of advice to offer it would be to stick with the program. "After three or four years of hard work, you are going to see significant gains" (11). The Forest Hills School District had such success with this program that it was adopted by the U. S. Drug Enforcement Administration as a model program for schools across the country.

Brady, Erik. "Newest Recruits to War on Drugs, Athletes to Serve as Role Model." USA Today 26 (October 1988) pp. 1Ct.

Brady reported that the problem of steroids in the schools has reached the point that SADD joined the war against them. The acronym that stands for Students Against Drunk Driving now has a second meaning as well: Student Athletes Detest Drugs. The national program headed by SADD founder Robert Anastas stated the idea was to use student athletes as anti-drug role models for the student body. "High school athletes are powerful forces in schools and could have a positive effect on students using steroids or other drugs" (1). Since SADD began in 1981, the number of teenagers killed in drunk driving accidents had fallen from 6,000 (1982) to 2,080 (1987). Brady concluded that Anastas hopes to have similar success in the battle against drugs.

Clark, Michael. "A Realistic Approach for Strength and Conditioning Coaches to Deal With Steroids." National Strength and Conditioning Association 10:2 (1988) 28-30.

Clark stated athletes today have to make a choice: to use performance enhancing drugs or face a competitive disadvantage. The pressure placed upon a young athlete today is tremendous. A more understanding approach of educating the athlete is needed. The education of athletes needs to be complete and not just one-sided. Clark also stated in the report there are definite ways to help guide athletes to avoid using steroids. Being too forceful and using scare tactics will only cause athletes to distrust that person. Clark stated besides educating athletes about the short-term versus long-term effects of steroids, we must also take the pressure off them by giving them alternatives to anabolic steroids. Alternatives Clark stated were the importance of diet and training, educating head coaches about steroids who unknowingly put pressure on athletes to use them and not endorsing those who write books, pamphlets, and make presentations on how to use steroids to their best advantage.

Flax, Ellen. "Steroids: Few Demanding That High School Athletes 'Just Say No'." Education Week 12 (October 1988) pp. 1t.

The author of this article used information from national surveys to convince readers of the growing need for education in high schools about the dangers of using steroids. On a national level it was estimated some 250,000 to 500,000 teenagers may have used steroids in 1987. Harry Edwards, a professor of sociology at the University of California at Berkeley stated, "It's simply a can of worms that high schools aren't prepared to deal with economically, professionally, or medically" (1). It should be noted that although few statistics exist on the rate of steroid use among teenagers, the experts believe the problem is growing. As competition for college scholarships grows more acute, more student athletes will feel the need to take steroids to win places on college squads. Flax concluded by stating that kids are using steroids because we as a society believe that winning is more important than integrity, honesty, and health itself.

Meintz, Erik K. "Steroids Are Big Trouble." American School and University (October 1988), 42A-42C.

Meintz is director of the "Steroids are Big Trouble" campaign for the University of Minnesota. This article was a summary of the University's antisteroids campaign which is designed to stimulate public awareness of this growing problem and to tell young athletes why steroids are of no positive use to them. The campaign has won the support of many powerful organizations such as the FDA, NCAA, and the NFL's Drug Advisory arm. Meintz stated one case of aids had been diagnosed through the sharing of needles used to inject steroids. Meintz believed this was another example why steroid use is not just an athletic concern but a social concern also. Meintz concludes that in order to reach our young people we will have to start with parents, coaches, and communities in redefining the win-at-all-cost approach. Otherwise, the ultimate price paid by young people won't be the loss of a meaningless game, but the loss of their health and possibly their lives.

Mannie, Ken. "Anabolic Steroids in the High Schools: The New Drug Crisis." National Coach 25:1 (Spring 1989) 10-11.

In this article Ken Mannie stated, "just as there are sixteen year olds who are drinking alcohol, smoking marijuana, and snorting cocaine, there are sixteen year olds who are swallowing and injecting anabolic steroids" (11). Mannie stresses that every educator and coach needs to provide young people with factual information on the very real possibilities of accelerated atherosclerosis, increased blood pressure, testicular cancers, and a host of other irregularities due to steroid use. This article states that anabolic steroids are synthetic analogues of the male sex hormone, testosterone. The masculinizing effects include increased aggressiveness, and the proliferation of other male sexual characteristics. The anabolic, or "building up" effects refer to the changes induced in muscle, bone and blood. As a collegiate strength and conditioning coach, Mannie stated "every educator and coach should keep an updated library on the subject and make the educational process an ongoing one. The "street info" on steroids is as inaccurate as some of the nonsense our kids hear about the "safe use" of cocaine and crack. There are plenty of big armed, self-proclaimed experts hanging out in some of the corner gyms who offer mythical advice on avoiding the hazards of steroid use. Their motive is the same as any other drug pusher; the selling of steroids is a multi-million dollar a year racket" (10).

SUMMARY

When examining the rationale and motivation of those who used steroids, Riley found two big reasons for steroid use among athletes. One being society's acceptance of drugs, and two being the pressure to win. Fuller and Lafountain agreed with Riley that the current win-at-all-cost mentality costs too much, but also cited several other motivations for steroid use among athletes: 1.) Steroid use was justified as an act of sacrifice, and as paying the price necessary to be competitive, 2.) Athletes did not see steroid use as being injurious to their health, employing every drug has side effects, 3.) Steroid-using athletes denied responsibility for their actions by condemning the condemners, they questioned the knowledge, motives, and integrity of doctors, trainers, and coaches, and 4.) Athletes appealed to higher loyalties, believing steroid use was equated with having a dedicated attitude. King and Banks found through their interviews of teenagers that steroids were used more by non-athletes than athletes. They stated skinny kids who were tired of being pushed around or ignored, longed for the muscles that could bring them distinction. Instead of spending years of hard work in the gym, students were beginning to try steroids as a quicker route to hulking bodies. Schiller's interviews agreed with King and Banks that non-competitive athletes were using steroids to improve self-image and to have big arms to impress women.

The research studies on the physical and psychological effects of steroids was very two-sided and unconclusive. When examining the research on weight gain attributed to anabolic steroid use, Casner, Early, Carlson, Loughton, Ruhling, Lamb and Alen all found that the subjects in their research gained a significant amount of weight using steroids, with Casner reporting as much as an eleven pound increase. Lamb's study also showed persons gaining an average 2.2. kg. of weight. Wade reported in his interviews with athletes that they (the athletes) could see a significant weight gain as a result of using steroids. In the area of muscular strength, Wade stated that athletes believed they increased in strength. The research of Win-May, Mya-Tu and Lamb seem to agree with Wade as their studies showed a significant increase in muscular strength. On the other side the study of Casner, Early, and Carlson found no significant difference on muscular strength or body composition as a result of using anabolic steroids.

Ariel and Saville believed their study clearly indicated that taking a placebo supplied the necessary psychological benefits to utilize strength gains above and beyond that which would be expected from a reasonable progression.

The research of Win-May, Mya-Tu and Lamb showed no substantial evidence to support the use of anabolic steroids for improving balance, coordination, flexibility and cardio-respiratory endurance.

Olweus' research to study the hypothesis that high testosterone leads to a strong and masculine appearance failed to find a clear association between testosterone and antisocial behavior. Whereas Fuller and Lafountain reported almost all the athletes interviewed taking steroids reported having personal problems with girl friends, increased aggressive behavior and irritability. Strauss, et. al., noted in his study that 67% of steroid users reported temporary changes in libido and 56% reported a temporary increase in irritability and aggressive behavior. Some of the athletes also noted an increased tendency to engage in physical fighting. Strauss, et. al., study also showed Gynecomastia was detected in athletes using steroids, but showed no differences in systolic or diastolic blood pressure among those athletes.

Alen found in his study that the availability of thyroid hormones was not disturbed in athletes and therefore does not have any demonstrable effect on athletes' performance in strength training. Alen's study did show the inhibition of testicular endocrine function following the cessation of drug use. Lamb's research also showed anabolic steroids caused severe virilization in women and testicular atrophy and reduced blood levels of gonatropins and testosterone in adult males.

In the area of preventing steroid use among high school students, the author's all agreed, education was a key step in dealing with this crisis. White believed factual information regarding steroids should be incorporated into existing health education classes. The U. S. Department of Education suggested

using the Forest Hills program consisting of getting coaches, athletes, parents, community and administrators involved in prevention education for students. The Forest Hills program did have some success reporting a 62% decline in drug use during the four years the program had been in place. Brady reported that SADD has joined the fight against steroids and other drugs and student athletes are used as role models for the student body. Clark believed education of steroids needs to be complete and not just one-sided. Clark also stated there are definite ways to help guide athletes to avoid using steroids. However, being too forceful or using scare tactics will cause athletes to distrust a person. Clark wanted coaches to take the pressure of the win-at-all-cost attitude off athletes and give them alternatives to anabolic steroids, such as the importance of diet and training. Flax stated in his article that some 250,000 to 500,000 teenagers may have used steroids in 1987. He contributes this to the growing competition for college scholarships which leads more students to take steroids in order to win places on college squads. Flax noted kids use steroids because as a society we believe that winning is more important than integrity, honesty, and health itself.

Meintz who is director of the "Steroids are Big Trouble" campaign for the University of Minnesota developed a program that was designed to stimulate public awareness of this problem and to tell young people why steroids are of no positive use to them. Meintz, in agreement with Flax and Clark, said that it is important to start with parents and coaches in redefining the

win-at-all-cost approach. Another author, Mannie, suggested every educator and coach should keep an updated library on the subject of steroids and make the educational process an ongoing one.

CONCLUSIONS

The use of anabolic steroids by athletes is controversial. On the one hand, many athletes believe that steroids improve athletic performance and thus provide an advantage to those who use them. On the other hand, the medical and scientific communities believed that inadequate research data existed to support the claim that anabolic steroids can improve athletic performance. However, there was data demonstrating their harmful effects. Therefore, a large information and credibility gap concerning anabolic steroids exists between the athletes and the medical and scientific communities.

The most prominent factors implied by most of the authors were the need for more comprehensive research studies on national and international levels to conclusively determine the effects of large doses and long term administration of anabolic steroids on the health and physical performance of athletes. Furthermore, they believed in the need to develop programs that could be incorporated in schools to help educate, prevent, and control anabolic steroid use among the youth. Riley put it best, "To hell with competition! Let's think about the well-being of the athletes. Their hunger to win far exceeds their capacity for intelligent decisions about their health and the health of their children. We should start prosecuting the panderers who sell, distribute, encourage, or tolerate the use of the stuff. And then we must educate the kids about the dangers of steroids and remove the unseemly pressure on them to win" (66).

RECOMMENDATIONS

It is recommended that:

1. More serious and continuing efforts should be made to educate athletes, coaches, trainers, physicians, physical and health educators regarding potential risks of steroid use.

2. All those who are concerned and supportive of athletic competition should re-evaluate their win-at-all-cost philosophy. Otherwise, the athletes' response to this pressure may include anabolic steroid use, directly determining the type of role model projected to our youth.

3. More comprehensive research studies be made on the national and international levels to conclusively determine the effects of large doses and long term administration of anabolic steroids on the health and physical performance of athletes.

4. More research be done on school-age subjects rather than college and adult population.

5. Every school library should obtain a copy of Dr. Bob Goldman's book, Death in the Lockerroom.

6. The Forest Hills 9 step prevention program be incorporated in the high schools.

7. Schools send for additional material on the University of Minnesota's "Steroids are Big Trouble" campaign.

8. Any school that has a Students Against Drunk Driving chapter also incorporate a Student Athletes Detest Drugs chapter to act as role models for the student body.

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APPENDIX

Tips for Coaches and Athletes

Coaches

1. Communicate the school's drug and alcohol policy early in the year and reinforce it frequently.
2. Enforce all school regulations and training rules.
3. Make sure parents understand the rules and enlist their cooperation.
4. Take the lead in coordinating alcohol and drug abuse prevention efforts with your athletic program.
5. Recognize the signs of alcohol and drug abuse.
6. Have an enforcement procedure for dealing with drug and alcohol use by your athletes.
7. Investigate suspected violations, confront the athlete, and inform the appropriate school officials immediately.
8. Notify the athlete's parents when a violation is confirmed.

Athletes

1. Pledge not to use drugs or alcohol yourself and encourage your teammates to make the same pledge.
2. Do not tolerate violations of the rules on the part of any of your teammates.
3. Urge that regular team meetings address the issues of substance abuse.
4. Take the lead in organizing team social activities that are drug and alcohol free.

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